

AI Chatbot Use and Psychosocial Outcomes: A Quantitative Study of Loneliness and Social Isolation in Generation Z

Konstantina Papagianni, Vasiliki Spatoula

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Konstantina Papagianni^{1*} BSc, MSc; Vasiliki Spatoula^{1*} DDS, MSc, PhD

¹ Faculty of Medicine Aristotle University of Thessaloniki Thessaloniki GR

*these authors contributed equally

Corresponding Author:

Konstantina Papagianni BSc, MSc

Faculty of Medicine
Aristotle University of Thessaloniki
Thessaloniki, Cental Macedonia
Thessaloniki
GR

Abstract

Background: The rapid integration of artificial intelligence(AI) into everyday life haw introduced new ways of interaction between human and technology, particularly through AI-powered chatbots. These tools are used by Generation Z, a cohort already identified as vulnerable to loneliness and social isolation. However, limited research has examined the psychosocial implications of AI chatbot use in this population.

Objective: This study aimed to investigate the relationship between AI chatbot use and psychosocial outcomes, specifically loneliness and social isolation among Generation Z.

Methods: A cross-sectional quantitative survey was conducted with 472 participants aged 15-30 years. Participants completed validated instruments: the General Attitudes toward AI Scale(GAAIS), the UCLA Loneliness Scale and Lubben Social Network Scale(LSNS). Demographic information and frequency/motives of AI chatbot use were also collected. Descriptive statistics, correlation analyses, and regression models were used to assess associations between chatbot use, loneliness, and social isolation.

Results: The final sample consisted of 472 participants (N=472). The demographic composition of the sample included 283(59.96%) females and 189 males (40.04%), with a mean age of 22,54(SD=3,528) (Table 1). Most participants reported regular use of smartphones and digital communication tools. Regarding educational background, 70.8% had current or completed tertiary education, 21.4% were high school graduates, and 7.8% had vocational or technical training. In terms of chatbot usage, 51.5% of participants were regular users (daily or frequently), while only 7.2% reported no use.

The mean loneliness score (UCLA Scale) was 42.84 (SD = 11.36), indicating moderate loneliness, while the mean LSNS score for social isolation was 37.99 (SD = 8.97), suggesting relatively intact social networks.

The results also indicate that while the frequency of chatbot use is not significantly associated with either perceived loneliness or social isolation, the underlying motivations for use play a critical role. Specifically, emotional motives-such as the need to talk or to address personal concerns-were positively associated with increased levels of loneliness, yet not with greater social isolation. This suggests that individuals who turn to chatbots for emotional reasons may experience a subjective sense of loneliness despite maintaining objectively adequate social networks.

Conclusions: This study examined the interplay between AI chatbot use and psychosocial outcomes-specifically loneliness and social isolation-among Generation Z. By moving beyond usage frequency and investigating the motivations underpinning chatbot interaction, the study offers important insights into how digital tools are integrated into the emotional and social lives of young people.

The findings demonstrate that usage frequency alone does not predict levels of loneliness or social isolation. Rather, the underlying purpose of use emerges as a significant factor. These results highlight the need to account for contextual and motivational variables when evaluating the mental health implications of AI tools. As conversational agents become more embedded in daily routines and social practices, researchers, designers, and policymakers should consider not only the frequency of engagement but also the underlying psychological drivers. While AI chatbots may provide short-term emotional relief and a

sense of companionship, they cannot substitute for the depth and reciprocity of meaningful human relationships. Their role should be framed not as replacements for social connection, but as complementary tools that must be integrated thoughtfully and ethically into a broader system of mental health and social support. Clinical Trial: Not applicable.

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1. Introduction

In an increasingly digital world, individuals are confronted with a paradox: we experience both increased connectivity and expanded social isolation. Despite unprecedented technological means to connect, loneliness remains a pervasive issue, affecting approximately a third of individuals in industrialized countries [1]. At the same time, several public health emergencies have impacted countries all over the world, often leading to social panic and negative emotions among the group, bringing significant challenges to the safety of society [2]. Public health crises such as COVID-19 pandemic have further intensified this phenomenon; the widespread social distancing, lockdowns, anxiety, and depression, even as the pandemic has transitioned into its post-pandemic phase [3].

Amid this backdrop, Artificial Intelligence(AI) technologies are rapidly permeating daily life. From personal digital assistants to AI chatbots and emotional support applications, AI has become a common mediator of human interaction [4,5]. Technological progress in this domain has been both swift and significant, enabling systems capable of simulating empathy, interpreting user sentiment, and engaging in conversational discourse that often resembles human-like interaction [6]. What was once confined to science fiction has become technological reality, forcing consideration of AI's part not only in professional and educational contexts but also in social and emotional domains.

Concurrently, research has underscored the severity of loneliness and social isolation as public health issues, while these conditions are linked to an array of adverse outcomes; mental health disorders such as depression and anxiety, physiological effects such as increased cardiovascular risk, impaired sleep, diminished cognitive functioning, and even early mortality [7,8]. Given the ubiquity of digital technologies and the risks of loneliness, it is essential to explore how emerging AI applications interact with these psychological processes. Some of these promise to alleviate feelings of loneliness, support mental well-being or even create relationships with users. Social chatbots provide social support that can affect mental health by offering a non-judgmental and readily available communication channel. They can serve as substitutes for friends, alleviating loneliness, in addition to clinical therapy [9].

Generation Z, comprising individuals born between roughly 1995 and 2010, is the first generation to grow up fully immersed in a digital ecosystem. These "digital natives" are often comfortable with-and sometimes reliant upon-smartphones, social media, and a range of AI-powered platforms from an early age [10]. Ironically, despite or perhaps because of their digital fluency, they report disproportionately high rates of loneliness, anxiety, and depression compared to earlier cohorts [11]. This disjuncture, a generation that is hyperconnected technologically yet emotionally disconnected, raises important questions about how they engage emotionally with AI. Research on the impact of these technologies is still at an early stage. Despite the growing popularity of AI applications, few studies have empirically examined their effect on loneliness and social isolation, especially in the context of young people [12]. Some researchers agree that AI companions could function positively as a form of companionship for individuals with limited social networks [13], while others highlight the risk of a false sense of emotional contact, which ultimately leads to greater withdrawal from real social relationships [14].

The importance of this intersection cannot be overstated. As AI applications become increasingly sophisticated and ubiquitous, their potential to both alleviate and intensify loneliness represents a critical area of inquiry with far-reaching implications for mental health, social development and the future of human connection [15]. Understanding how Generation Z, as the primary adopters and shapers of these technologies, experiences the relationship between AI applications and loneliness is essential for informing policy decisions, further technological developments, and therapeutic interventions aimed at promoting healthy social development in the digital age [16].

While chatbots have existed for a long time, it is only recently that they have reached a level of sophistication that enables them to engage in social conversations with fluidity that can be

indistinguishable from interhuman conversations [17].

The rapid advancement and proliferation of artificial intelligence applications has fundamentally transformed the landscape of social interaction and companionship, particularly for digitally native populations. Contemporary AI applications extend far beyond traditional computing tasks to encompass social and emotional functions that were previously the exclusive domain of human interaction. Conversational AI systems, such as chatbots and virtual assistants, now engage in increasingly natural and empathetic dialogues with users, providing support, and even trying to imitate therapeutic interventions [18]. Social media platforms employ AI algorithms to curate personalized content experiences, facilitate connections between users, and predict social preferences with remarkable accuracy [19].

Modern AI systems can analyze linguistic patterns, emotional cues, and behavioral data to provide personalized responses that often feel remarkably human-like [20]. Virtual companions and AI-powered mental health applications offer 24/7 availability, non-judgmental interaction, and consistent emotional support, features that may be particularly appealing to individuals experiencing loneliness or social anxiety. For Generation Z, who have grown up alongside these technologies, AI applications represent not merely tools but potential social partners that can fulfill various relational needs [21].

The integration of AI into social contexts has created new categories of relationships and social experiences that challenge traditional conceptualizations of companionship and connection. These relationships exist in a liminal space between human and machine interaction, raising fundamental questions about the nature of social connection, emotional authenticity, and the potential for AI to serve as a substitute for human relationships [22].

The examination of AI applications' effect on depression and social confinement requires drawing upon different hypothetical systems that light up distinctive perspectives of this complex phenomenon [23]. Social penetration theory, by Altman and Taylor, gives a system for understanding how connections are created through progressive self-disclosure and expanding closeness. In the setting of AI interactions, this hypothesis raises questions around whether AI applications can encourage the kind of complementary self-disclosure that characterizes significant human connections, or whether they create an illusion of closeness that may eventually demonstrate as unacceptable [24].

The social compensation hypothesis offers another focal point through which to examine AI's role in addressing loneliness. This system proposes that individuals who experience difficulties in face-to-face interactions may turn to alternative forms of social connection to compensate for these deficits [25]. For Generation Z people who experience social anxiety or have difficulty shaping traditional relationships, AI applications could potentially serve as a bridge to social associations, giving a low-stakes environment for practicing social skills and experiencing companionship [26]. However, the social displacement hypothesis presents a differentiating perspective, suggesting that time and emotional investment in AI relationships may come at the expense of human relationships, possibly exacerbating social isolation [27].

Attachment theory provides additional insight into how individuals might form connections with AI applications. Understanding these attachments dynamics is crucial for evaluating whether AI applications support healthy social development or contribute to maladaptive relationship patterns [28]. The concept of social presence, characterized as the subjective experience of being with another entity in a communication environment, is particularly relevant to understanding AI-mediated social connection [29]. Research has shown that higher levels of social presence in digital interactions are associated with increased satisfaction and engagement [30]. AI applications that successfully create a sense of social presence may provide genuine social benefits, while those that feel artificial or impersonal may fail to address loneliness or may even exacerbate feelings of isolation by highlighting the absence of authentic human connection [31].

Despite the growing prevalence of AI applications in social contexts and the well-documented

loneliness epidemic among Generation Z, there remains a significant gap in empirical research examining the intersection of these phenomena. Much of the existing literature on AI and social connection focuses on older adults or examines AI applications in therapeutic contexts, with limited attention to how digitally native young adults experience AI-mediated social interaction [32]. Similarly, research on Generation Z loneliness has primarily focused on social media use and traditional digital communication, with minimal investigation of how emerging technologies might influence social isolation experiences [33].

The purpose of this study was to explore whether and how the use of AI applications is related to levels of loneliness and social isolation Generation Z individuals in Greece. The study contributes to the emerging field of AI and mental health by providing empirical evidence on how human interaction with artificial agents may relate to fundamental psychosocial needs. The findings could have implications for developers of AI technologies, mental health professionals, educators, and policymakers, particularly in designing tools that foster emotional well-being without replacing human connection.

2.Method

2.1. Sample

A total of four hundred and seventy-two (N=472) participants took part in the study. All participants were members of Generation Z, defined here as individuals born between 1995 and 2010. Inclusion criteria required that participants be aged between 15 and 30 years old, possess sufficient digital literacy to interact with AI-based applications, and provide informed consent. The sample was drawn through convenience sampling via online platforms (e.g. university mailing lists, social media), targeting students and young adults familiar with technology.

Data collection took place during the period of May-July 2025. Participants were invited to complete an anonymous online questionnaire, created and distributed using Google Forms. The questionnaire included an informed consent form, demographic questions, and the three psychometric scales described above. Participants were informed that their responses were anonymous and confidential, that they could withdraw from the study at any time, and that there were no anticipated risks associated with participation. Ethics approval was obtained by the Ethic Committee of the Aristotle University of Thessaloniki (8/17.6.2025). Completion of the survey required approximately 10–15 minutes. No financial compensation was provided for participation.

2.2 Material

For the purposes of the study three standardized psychometric tools were used: General Attitudes towards Artificial Intelligence Scale, UCLA Loneliness Scale, Lubben Social Network Scale-R. All instruments were translated and validated in Greek population.

a. General Attitudes toward Artificial Intelligence Scale (GA AIS)

General Attitudes toward Artificial Intelligence Scale was used to measure participants' attitudes and engagement with AI applications with alpha reliability $\alpha = .851$. It comprises 16 items rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree), divided into two subscales: positive attitudes (e.g., "AI can improve decision making") and negative attitudes (e.g., "AI threatens human uniqueness"). This scale assesses multiple dimensions of user interaction, including perceived usefulness, trust, and frequency of use. Higher scores indicate more frequent and/or positive interactions with AI systems (Schepman & Rodway, 2023). GA AIS assesses individuals' positive and negative attitudes toward AI.

b. UCLA Loneliness Scale (Version 3)

The UCLA Loneliness Scale is a widely used 20-item self-report questionnaire that measures subjective feelings of loneliness and social isolation with alpha reliability $\alpha = .89$. Items are rated on a 4-point Likert scale (1=never to 4=often), with higher scores indicating greater loneliness. The scale includes both positively and negatively worded items, with positive items reverse scored (Russell, 1996).

c. Lubben Social Network Scale (LSNS-6)

The LSNS-6 is a brief, 6-item instrument designed to assess social engagement and perceived support from family and friends, with alpha reliability - $\alpha = .818$. Each item is rated on a 6-point scale (0 = None to 5 = Nine or more), with higher scores indicating stronger social networks and lower risk of social isolation. The scale is divided into two subscales: family and friends. Scores below a certain threshold suggest social isolation (Lubben et al., 2006)

3. Results

The final sample consisted of 472 participants (N=472). The demographic composition of the sample included 283(59.96%) females and 189 males (40.04%), with a mean age of 22.54(SD=3.528) (Table 1). Most participants reported regular use of smartphones and digital communication tools. Regarding educational background, 70.8% had current or completed tertiary education, 21.4% were high school graduates, and 7.8% had vocational or technical training. In terms of chatbot usage, 51.5% of participants were regular users (daily or frequently), while only 7.2% reported no use.

Table 1: Sample

Gender	Age M(SD)
283 (59.96%) F	
189 (40.04%) M	
N=472	22.54 (3.53)

Data was analyzed using IBM SPSS Statistics (V31). The mean loneliness score (UCLA Scale) was 42.84 (SD = 11.36), indicating moderate loneliness, while the mean LSNS score for social isolation was 37.99 (SD = 8.97), suggesting relatively intact social networks. (Table 1). Correlation analysis using Spearman's rho showed no significant association between chatbot usage frequency and loneliness ($r = .005$, $p = .908$) or social isolation ($r = -.072$, $p = .118$). However, a strong negative correlation emerged between loneliness and social isolation ($r = -.583$, $p < .001$). Multiple regression analysis revealed that emotional motivations for chatbot use were significant predictors of loneliness. Specifically, users who cited "needing to talk" ($B = 7.563$, $p < .001$) or "resolving a personal issue" ($B = 4.336$, $p = .002$) reported higher loneliness. In contrast, cognitive or functional motivations (e.g., curiosity, learning) were linked to lower loneliness ($B = -3.023$, $p < .001$). Usage frequency alone was not a significant predictor ($p = .278$). A chi-square test confirmed a significant association between high loneliness levels and the reason "needing to talk" ($\chi^2(2) = 12.39$, $p = .002$), with 78.6% of those citing it belonging to the high-loneliness group. A second regression model for social isolation found only one significant predictor: the emotional motive "needing to talk" was associated with lower social isolation ($B = -6.76$, $p < .001$), indicating that while these individuals felt lonelier, their social networks remained objectively active. No other variables were significant. Lastly, Mann-Whitney U tests revealed gender differences in attitudes toward AI, with men scoring higher than women on both positive ($U = 19,785$, $Z = -5.38$, $p < .001$) and negative ($U = 21,346.5$, $Z = -4.03$, $p < .001$) subscales of the GAAIS.

As shown in Table 2 the results indicate that while the frequency of chatbot use is not significantly associated with either perceived loneliness or social isolation, the underlying motivations for use play a critical role. Specifically, emotional motives-such as the need to talk or to address personal concerns-were positively associated with increased levels of loneliness, yet not with greater social isolation. This suggests that individuals who turn to chatbots for emotional reasons may experience a subjective sense of loneliness despite maintaining objectively adequate social networks.

Table 2: Results

Type of Analysis	Variable(s) Involved	Result
Correlation	Chatbot use frequency & Loneliness	$r = .005, p = .908$ (ns)
	Chatbot use frequency & Social Isolation	$F = -.072, p = .118$ (ns)
	Loneliness & Social Isolation	$r = -.583, p < .001$
Regression (Loneliness)	Emotional motive: Needing to talk	$B = 7.563, p < .001$ (positive predictor)
	Emotional motive: Resolving a personal issue	$B = 4.336, p = .002$ (positive predictor)
	Cognitive/Functional motives	$B = -3.023, p < .001$ (negative predictor)
	Frequency of use	$p = .278$ (ns)
Regression (Social Isolation)	Emotional motive: Needing to talk	$B = -6.76, p < .001$ (negative predictor of isolation)
	Other motives and frequency	Not significant
Chi-square Test	Loneliness group $\times$ "Needing to talk"	$\chi^2(2) = 12.39, p = .002$
Mann-Whitney U	Gender differences (GAAIS – positive subscale)	$U = 19,785, Z = -5.38, p < .001$
	Gender differences (GAAIS – negative subscale)	$U = 21,346.5, Z = -4.03, p < .001$
Kruskal-Wallis H	Chatbot use frequency & loneliness/social isolation	No significant differences after Bonferroni correction

4. Discussion

The present study aimed to explore the relationship between perceptions and attitudes toward the use of AI-based chatbot applications and the psychosocial outcomes of loneliness and social isolation among members of Generation Z. Drawing on a sample of 472 participants aged 15-30 years, the findings provide novel insight into the complex role that AI-mediated interactions may play in the social and emotional well-being of young people.-

In line with previous research emphasizing the buffering role of social support in mitigating loneliness [34], the present study identified a strong negative correlation between scores on the UCLA Loneliness Scale and the LSNS-6. This suggests that individuals with stronger social networks report significantly lower levels of subjective loneliness. Such findings reinforce the well-established understanding that perceived emotional and instrumental support acts as a protective factor against psychological distress [35,36].

Notably, the frequency of chatbot use did not exhibit a statistically significant association with either loneliness or social isolation. This finding stands in contrast to deterministic models proposing that increased AI engagement inherently improves or deteriorates well-being [9,37,38]. Instead, the results align with a more context-sensitive approach, supporting the emerging view that users' motivations for engaging with AI may be a more critical determinant of psychosocial outcomes than usage frequency alone [39]. A more differentiated understanding emerged through multiple regression analysis that examined specific usage motives.

Emotional motives for chatbot use, such as a need to talk or the desire to resolve personal issues, significantly predicted higher levels of loneliness. This suggests that individuals who turn to AI-based tools to fulfill emotional needs may already be experiencing heightened emotional vulnerability or unfulfilled relational needs. Conversely, cognitive and informational motives, such

as curiosity, educational purposes, or logical problem solving were associated with lower loneliness scores. These findings lend empirical support to the uses-and-gratifications theory, which posits that media users actively select technological tools to satisfy psychological or social needs [40,41].

Interestingly, while emotional motives predicted increased loneliness, they simultaneously predicted lower levels of social isolation. This apparent contradiction invites a more nuanced interpretation. It is plausible that individuals who engage with AI for emotional expression are not objectively isolated given the maintenance of existing social networks - yet still experience pronounced feelings of loneliness [42,43]. This aligns with the distinction between objective and subjective forms of social disconnection [44]. The data suggests that chatbots may serve as a supplementary outlet for emotional expression, potentially alleviating feelings of isolation without addressing the deeper emotional complexity of loneliness.

This complexity is further reflected in the significant chi-square association between high loneliness and the motive “needing to talk”. Nearly 79% of participants endorsing this motive belonged to the high-loneliness group. This finding resonates with previous qualitative research on AI companionship, which suggests that individuals frequently use chatbots for emotional regulation rather than for cultivating meaningful, lasting social bonds [17,45]. While such interactions may offer transient emotional comfort or function as stopgap mechanisms, they appear insufficient in addressing the root causes of loneliness [46,47].

Gender differences also emerged in perceptions and evaluations of AI [48]. Males scored significantly higher than females on both positive and negative subscales of the General Attitudes toward Artificial Intelligence Scale (GAAIS), indicating a broader spectrum of attitudes-both favorable and unfavorable. This may reflect greater technological familiarity among males, or different levels of exposure and critical engagement with AI systems [49]. The literature consistently reports gendered patterns in digital interaction and technology use [50,51] underscoring the need to further examine how these differences manifest in emotional versus instrumental AI engagement.

From a theoretical standpoint, these findings contribute to a more dynamic and context-dependent understanding of human-AI interaction. Rather than viewing chatbot use as inherently beneficial or harmful, our results support a contextual and motivational model of AI engagement. Psychosocial outcomes appear to be shaped less by the presence of AI and more by the psychological motives underpinning its use ((52). Emotional reliance on AI may serve as an indicator of unmet relational needs, whereas cognitive or task-oriented use may reflect more adaptive engagement without the emotional cost associated with loneliness [53,54].

The practical implications of these findings are considerable. Educators and mental health professionals working with Generation Z should be cautious about recommending AI tools as substitutes for human connection [55,56]. Although AI chatbots may offer instant responses and simulate empathic engagement, they are not equipped to meet the intricate emotional needs of individuals experiencing deep social disconnection [57,58]. Intervention aimed at reducing loneliness should prioritize the reinforcement of real-world social networks over increased AI interaction (2,3). However, the data also indicates that for users who are not severely isolated, chatbots may serve a complementary role in facilitating emotional exploration or self-expression.

Finally, AI system developers should consider emotional vulnerabilities of younger users [59]. Incorporating safeguards signposting users to human support services when indicators of loneliness or emotional distress are detected could be an ethical advancement in chatbot design [60,61]. Moreover, developing AI applications with transparency, emotional nuance, and clearly defined boundaries may help mitigate the psychosocial risks identified in this study [62].

Limitations

There are several reasons why our findings should be interpreted with caution. The first limitation concerns the cross-sectional design of the study, precluding causal inferences. Second, reliance on self-reported data may introduce social desirability or recall bias. Third, although the sample size was adequate, it consisted primarily of educated young adults in Greece, which limits

generalizability.

5. Conclusion and Future Directions

This study examined the interplay between AI chatbot use and psychosocial outcomes-specifically loneliness and social isolation-among Generation Z. By moving beyond usage frequency and investigating the motivations underpinning chatbot interaction, the study offers important insights into how digital tools are integrated into the emotional and social lives of young people.

The findings demonstrate that usage frequency alone does not predict levels of loneliness or social isolation. Rather, the underlying purpose of use emerges as a significant factor. These results highlight the need to account for contextual and motivational variables when evaluating the mental health implications of AI tools. As conversational agents become more embedded in daily routines and social practices, researchers, designers, and policymakers should consider not only the frequency of engagement but also the underlying psychological drivers. While AI chatbots may provide short-term emotional relief and a sense of companionship, they cannot substitute for the depth and reciprocity of meaningful human relationships. Their role should be framed not as replacements for social connection, but as complementary tools that must be integrated thoughtfully and ethically into a broader system of mental health and social support.

Future research should employ longitudinal or experimental designs to establish causal pathways between AI engagement and psychosocial outcomes. Qualitative methods could also yield deeper insight into how individuals, particularly those in vulnerable groups, emotionally relate to AI companions. Future studies should differentiate between traditional scripted chatbots and more sophisticated, human-like conversational agents to capture potentially divergent psychosocial effects. Ultimately, understanding the nuanced relationship between AI interaction and well-being will require an interdisciplinary approach-one that bridges psychological theory, technological design, and ethical governance-to ensure that these tools are developed and deployed in ways that support, rather than undermine, human connection.

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